

## 7-5: Geometric Sequences

**Warmup:** Find the next three terms.

1. 14, 42, 126, 378, ...

2.  $2, \frac{1}{2}, \frac{1}{8}, \frac{1}{32}, \dots$

Examine the sequence: 48, 72, 108, 162, 243, 364.5... What pattern exists?

*Geometric/Exponential Sequence:*

*Constant ratio:*

*Recursive Formula for a Geometric Sequence:*

Example 1: Give the next 6 terms.

$$\begin{cases} g_1 = 4 \\ g_n = 3g_{n-1} \text{ for } n \geq 2 \end{cases}$$

*Explicit Formula for a Geometric Sequence:*

\*\*\*The first term can be written and found by using the explicit formula:

*Question:* What is the difference between an arithmetic and geometric sequence?

Example 2: Write the first 5 terms of the sequence  $g_n = 4(-2)^{n-1}$ , for int.  $n \geq 1$ .

Example 3. A ball is dropped from a height of 6 m and bounces up to 85% of its previous height after each bounce. Let  $h_n$  be the greatest height after the  $n^{\text{th}}$  bounce. Find a formula for  $h_n$  and the height after the 10<sup>th</sup> bounce.

It is important that you keep in mind what the problem is giving and what it is asking for. Here, 6 m is the initial height, but  $h_1$  is the height after the first bounce.

*Homework:*

*"It was on my fifth birthday that Papa put his hand on my shoulder and said, 'Remember, my son, if you ever need a helping hand, you'll find one at the end of your arm.'" - Sam Levenson*